CLAIMS:

1. A solid state optical spectrometer for combustion flame temperature determination, the spectrometer comprising:

a first photodiode device for obtaining a first photodiode signal, the first photodiode device comprising a silicon carbide photodiode and having a range of optical responsivity within an OH band;

a second photodiode device for obtaining a second photodiode signal, the second photodiode device comprising a silicon carbide photodiode and a filter, the second photodiode device having a range of optical responsivity in a different and overlapping portion of the OH band than the first photodiode device;

a computer for obtaining a ratio using the first and second photodiode signals and using the ratio to determine the combustion flame temperature.

2. The spectrometer of claim 1 wherein the filter comprises an integral filter.

3. The spectrometer of claim 1 wherein the filter comprises aluminum gallium nitride.

4. The spectrometer of claim 1 wherein the filter comprises silicon oxide and silicon nitride.

5. The spectrometer of claim 4 wherein the filter comprises silicon oxynitride.

6. The spectrometer of claim 4 wherein the filter comprises alternating thin film layers of silicon oxide and silicon nitride.

7. The spectrometer of claim 1 wherein the computer includes a look-up table for using the ratio to determine the combustion flame temperature.

8. The spectrometer of claim 7 wherein the look-up table is a look-up table fabricated by performing the following calculations at a plurality of different temperatures:

multiplying each of a first set of spectral line strengths (S_j) associated with respective wavelengths (j) by a respective quantum mechanical form of the Black body radiation law (R_j) and by a respective photodiode responsivity (X_j) and summing the multiplied line strengths into a respective first summation;

multiplying each of a second set of spectral line strengths (S_i) associated with respective wavelengths (i) by a respective quantum mechanical form of the Black body radiation law (R_i) and by a respective photodiode responsivity (X_i) and summing the multiplied line strengths into a respective second summation; and

dividing one of the first and second summations by the other of the first and second summations.

9. The spectrometer of claim 7 wherein the look-up table is a look-up table fabricated by performing the following calculations at a plurality of different temperatures:

multiplying each of a first set of spectral line strengths (S_j) associated with respective wavelengths (j) by a respective quantum mechanical form of the Black body radiation law (R_j) and by a respective photodiode responsivity (X_j) and summing the multiplied line strengths into a respective first summation;

multiplying each of a second set of spectral line strengths (S_i) associated with respective wavelengths (i) by a respective quantum mechanical form of the Black body radiation law (R_i), by a respective photodiode responsivity (X_i), and by a respective optical transparency (Y_i) of the filter, and summing the multiplied line strengths into a respective second summation; and

dividing one of the first and second summations by the other of the first and second summations.

10. A solid state optical spectrometer for combustion flame temperature determination, the spectrometer comprising:

a first photodiode device for obtaining a first photodiode signal, the first photodiode device comprising a silicon carbide photodiode and having a range of optical responsivity within an OH band;

a second photodiode device for obtaining a second photodiode signal, the second photodiode device comprising a silicon carbide photodiode and an aluminum gallium nitride filter, the second photodiode device having a range of optical responsivity in a different and overlapping portion of the OH band than the first photodiode device;

a computer for obtaining a ratio using the first and second photodiode signals and using the ratio to determine the combustion flame temperature.

11. The spectrometer of claim 10 wherein the filter comprises an integral filter.

12. A method for combustion flame temperature determination comprising:

obtaining a first photodiode signal using a first photodiode device comprising a silicon carbide photodiode and having a range of optical responsivity within an OH band;

obtaining a second photodiode signal by using a second photodiode device comprising a silicon carbide photodiode and a filter, the second photodiode device having a range of optical responsivity in a different and overlapping portion of the OH band than the first photodiode device; and

obtaining a ratio using the first and second photodiode signals and using the ratio to determine the combustion flame temperature.

13. The method of claim 12 wherein using the ratio to determine the combustion flame temperature comprises using a look-up table.

14. A photodiode device comprising: a silicon carbide photodiode; and an aluminum gallium nitride filter.

15. The photodiode device of claim 16 wherein the aluminum gallium nitride filter comprises an integral aluminum gallium nitride filter.

16. A method for fabricating a photodiode device for combustion flame temperature determination comprising fabricating an integral filter over a silicon carbide photodiode.

17. The method of claim 16 wherein fabricating the integral filter comprises growing an aluminum gallium nitride filter.

18. The method of claim 16 wherein fabricating the integral filter comprises fabricating a silicon oxynitride filter.

19. The method of claim 16 wherein fabricating the integral filter comprises alternating thin film layers of silicon oxide and silicon nitride.